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COVER

Republic F-105Ds were among several varieties of military aircraft participating in Operation Big Lift. FAA's role in this giant airlift is told on page 6.

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CONTENTS

3 PROGRAM LAUNCHED TO DEVELOP SHORT-HAUL, PASSENGER-CARGO TRANSPORT

4 VETERAN FAA ENGINEER-TEST PILOT AWARDED FIRST BURROUGHS TROPHY

4 IN-FLIGHT AID GIVEN TO 1,900

5 FIRST ANNUAL AVIATION MECHANIC SAFETY AWARD WINNERS ANNOUNCED

6 TOGETHERNESS IN THE COCKPIT ENHANCES SAFETY

6 TRAFFIC CONTROLLERS LAUDED FOR "BIG LIFT" EFFORTS

6 JOINT AIR DEFENSE-CIVIL TRAFFIC CONTROL FACILITY IS ESTABLISHED

7 FAA ESTABLISHES DELIVERY POSITIONS FOR SST

7 GENERAL AVIATION PILOTS FILE MORE VFR FLIGHT PLANS

8 NEW KITTY HAWK AIRPORT, WRIGHT AIRPLANE REPLICA MARK ANNIVERSARY OF POWERED FLIGHT

10 OPEN HOUSE AT DULLES

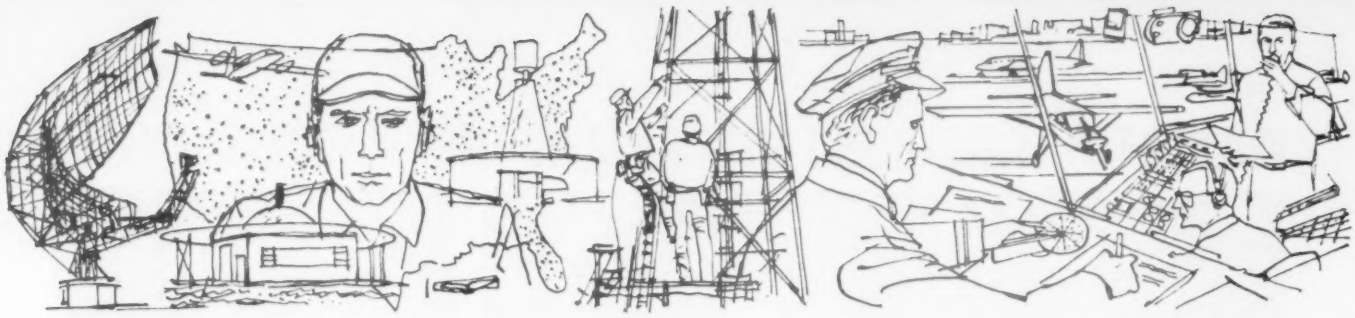
11 CARBON MONOXIDE INVADES COCKPIT, PILOT "TALKED" TO SAFETY

12 CEILING

14 SAFETY FIRST: WATCH YOUR FUEL

15 LETTERS

JOHN FITZGERALD KENNEDY
1917-1963



PROGRAM LAUNCHED TO DEVELOP SHORT-HAUL, PASSENGER-CARGO TRANSPORT

The DC-3—the affectionately nicknamed "Gooney Bird" of World War II and still the standard aircraft of many airlines around the globe—may soon go the way of the dodo bird.

FAA Administrator N. E. Halaby last month announced a proposed Government-industry program to stimulate the development and production of an economically-feasible, short-haul, passenger-cargo aircraft.

The proposed 14 to 24-passenger aircraft would be designed primarily to meet the needs of U.S. local service airlines and the short-haul operations of other airlines in this country and abroad. Additional market possibilities are the military services and general aviation.

The short-haul market presently is dominated by the DC-3, an aircraft fast approaching its 30th birthday.

The proposed short-haul transport would be the logical replacement for the DC-3. More important, however, it would be an aircraft designed to open new avenues in air transportation as was done by the DC-3 in its day.

The projected program would be essentially one of Government stimulus to industry. The Government does not propose to undertake or fund the direct development of a short-haul transport. Instead, FAA would provide a basis and an incentive between the customer—private and governmental—and the producer to assure the availability of a common airplane in sufficient production to make the vehicle economically desirable for all.

The proposed program would involve a limited design competition to produce detailed specifications and cost data for a practical short-haul transport. It is expected that this competition would produce a design which would meet requirements of several government agencies and permit fixed priced orders of sufficient numbers of the aircraft to enable the manufacturer to place it in volume production.

Concurrently, FAA also proposes in consultation with the Department of Commerce and the Civil Aeronautics Board to undertake an economic analysis to better illuminate the potential market for the short-haul transport. Current estimates range from 700 aircraft to more than 1,000.

First DC-3 produced was delivered July 11, 1936.

Looking at the DC-3 today, it is difficult to imagine that this squat, rather ugly aircraft originally was conceived as a luxury sleeper airliner.

Fortunately, more practical heads prevailed, and the familiar 21-passenger seating arrangement was adopted instead.

The DC-3 first flew in December, 1935, and entered regular commercial service the following summer. By 1938, the aircraft was standard equipment on the major U.S. airlines and on many foreign airlines as well.

During World War II, the DC-3 compiled a distinguished military record. The aircraft regularly operated from 5,000-10,000 pounds above specified load limits and carried as many as 74 passengers in emergencies.

More than 10,000 DC-3s were built for the military before production ended in 1946. Another 800 were produced as commercial airplanes.

FAA estimates that some 3,300 DC-3s are still in service around the world. This total includes 250 with U.S. airlines; 1,000 with foreign airlines; 1,100 with U.S. military; and 425 in general aviation.

Design objectives for the aircraft were outlined in a draft Request For Proposals (RFP) recently released for industry comment.

The planning schedule calls for evaluation of all comments and issuance of a final RFP before January 1, 1964. Closing date for industry proposals based on the RFP would be sometime next spring.

The projected program then calls for the selection of not more than three manufacturers to proceed under one-year Government contracts with detailed design studies. Cost to the Government would not exceed $100,000 per contract.

Detailed design specifications would be due in the latter part of 1964. Selection of the most promising design would be made by FAA with the technical support of other Government agencies after receiving the evaluation and advice of the local service airlines and other interested groups. The results would probably be announced sometime before the end of 1964.

Design objectives outlined in the draft RFP include the following:

- The aircraft should carry 14 to 24 persons in comfortable but not luxurious surroundings and be capable of converting to partial or all-cargo operations in a few minutes.
- Crew should consist of pilot and co-pilot who must be able to perform all the necessary safety functions.
- Additional payload should be between 500 pounds (in the 14 seat aircraft) and 800 pounds (in the larger 24-seat version). This is sufficient to allow profitable transport of mail, parcels and commercial cargo.
- The non-refueled range should include four 100-mile segments with adequate fuel reserves for instrument operations and provision for optional added tankage.
- Aircraft should be able to operate from airports with 3,000 foot runways.
- Cruise speed should be at least 200 miles per hour, providing reasonable enroute time between the cities served.
- The propulsion system should consist of at least two turbine engines of minimum size, noise, cost and complexity and provide maximum reliability.

VETERAN FAA ENGINEER-TEST PILOT AWARDED FIRST BURROUGHS TROPHY

Left, Joseph Tymczyszyn, noted test pilot, who won Burroughs trophy. *Photo by Air Progress Magazine.*

R. H. Burroughs International Test Pilot Award.

The first Burroughs International Test Pilot Award was presented last month to Joseph J. Tymczyszn, FAA test pilot and aeronautical engineer.

Tymczyszyn (pronounced Tim-Siz-In), 45-year-old son of a Pennsylvania coal miner, heads FAA's West Coast Supersonic Transport Office and has participated in the preparation of tentative objectives and standards for supersonic transport design proposals. The three major air frame manufacturers who have submitted proposals for the SST—Boeing, North American and Lockheed—are all on the West Coast.

The award, sponsored by United Aircraft Corp., honors test pilots for significant contributions to the safety and efficiency of flight testing and advancement of aerospace science. It is named for Richard H. Burroughs, a Chance Vought test pilot who was killed when he chose to guide his disabled experimental aircraft away from an inhabited area when he could have bailed out to save his own life. The Flight Safety Foundation administers the award. Selections are made from a slate of international test pilots nominated by a panel of aviation and aeropace research and development experts chosen by the Foundation.

Since joining the FAA in 1948 as a project test pilot and flight test engineer, Tymczyszyn served as test pilot on more than 40 projects, including the new family of jet transports. Test methods devised by Tymczyszyn for the new transports are now FAA standards.

During the past ten years, the major part of Tymczyszyn's work has been with big jets such as the Boeing 707 and Douglas DC-8, working with the manufacturers from the airplane concept through mock-up to fabrication of the prototype and on through the various production modifications. He also handled the major portion of the Lockheed 1049 and 1649 Constellation testing, the Lockheed R-7V turboprop, the Douglas DC-6B, DC-7B and DC-7C, some Convair 340-440 turboprop certifications and many smaller modification projects.

Not all of Tymczyszyn's flight test time is spent in the air. For each hour in the air he spends five in data analysis and engineering meetings before and after flight.

Tymczyszyn holds the 1958 Ivan C. Kincheloe Award for Outstanding Pilot Achievement and the 1960 Institute of Aeronautical Sciences' Chanute Award for "notable contribution in the inauguration of the jet age through outstanding flight test activity in the certification programs for the new jet transports."

He recently was installed as president of the International Society of Experimental Test Pilots.

Born in Wilkes-Barre, Pa., Tymczyszyn attended the University of Denver for three years while working at a flying school to obtain his commercial pilot license. He interrupted his schooling during World War II to serve as flight instructor and later as flight test engineering and maintenance officer of various combat aircraft. After the war he completed his schooling at the University of Washington and received a B. S. degree in Aeronautical Engineering.

Tymczyszyn holds an airline transport rating and commercial, instrument, instructor, seaplane, helicopter and glider ratings. He has logged over 8900 pilot hours, more than 3,000 of which are test flight hours. Since April, 1962, he has centered his activities on development of a supersonic transport, working closely with NASA and the USAF.

Tymczyszyn is married and has five sons ranging in age from 6 to 18, two already pilots.

IN-FLIGHT AID GIVEN TO 1,900

More than 1,900 aircraft in trouble got an in-flight helping hand from FAA in the year ending June 30, 1963. Included in the total were 325 military airplanes.

The "saves" or flight assists were performed by FAA air traffic controllers and flight service specialists.

Lost aircraft were the largest single category of planes in distress and requiring ground assistance. Next largest group were pilots caught on top of an overcast or in bad weather with neither the experience nor equipment to handle the situation. Many of these were low on fuel when they called for assistance. Other pilots aided by FAA personnel were experiencing mechanical trouble or malfunction of navigation equipment.

FIRST ANNUAL AVIATION MECHANIC SAFETY AWARD WINNERS ANNOUNCED

A wartime Air Force crew chief and a Navy veteran were named national winners in FAA's first annual Aviation Mechanic Safety Awards program. The awards honor aviation mechanics in both general aviation and air carrier operations who have made significant contributions to safety.

A ten-member committee selected by the Flight Safety Foundation and headed by Lt. Gen. James H. Doolittle selected the national winners. Trophies were provided the two national winners as well as 15 regional winners by American Aviation Publications which will sponsor future awards.

The general aviation winner is Norton G. Stubblefield, 42, superintendent of the aircraft shop for Morrison-Knudsen, Inc., at Gowen Field, Boise, Idaho. He is responsible for over-all maintenance of seven twin-engine executive airplanes based at Gowen.

Stubblefield noticed that the suction relief valve for vacuum flight instrument systems located in the wheel well was malfunctioning when foreign matter entered. He recommended relocation of the valve and fabricated the new assembly, incorporating several new safety features that he designed. His company reports no related in-flight instrument failures since.

He began his aviation career with the Army Air Corps in 1939 and joined Morrison-Knudsen, a construction and engineering firm, in 1953.

Winner in the air carrier category was John Motta, a TWA aviation mechanic specializing in the electrical system of the 707s and 880s. Motta, 39, was cited for tracking down the cause of deficiencies in the electrical ground bracket for jet engine generators. In checking generator malfunction, Motta recommended consolidating three of the ground leads at a single terminal. TWA accepted this suggestion and modified all of its equipment. The airframe manufacturer also was sufficiently impressed to recommend the change to all operators of the equipment.

Motta served in the Navy in World War II as a fire control man. He has been with TWA for 12 years and resides in Torrance, Calif.

Norton G. Stubblefield, general aviation winner.

Other winners were:

Western Region (Air Carrier) Glenn B. Kay, United Air Lines, San Francisco, for developing test procedures that revealed the cause of a particular electrical malfunction on electrically heated windshields on jet aircraft. Joined United in 1955.

Central Region (General Aviation) Erwin A. Schwarzkopf, lead mechanic, Lincoln Aviation Institute, Inc., Union Airport, Lincoln, Neb., for constructing jigs and designing equipment used in repairing, machining and testing aircraft parts and systems. Joined Lincoln in 1942.

Eastern Region (Air Carrier) Edward Baranow, Northeast Airlines, Logan International Airport, Boston, Mass., for suggesting a fix and procedure that eliminated the chance of chafing and breaking of the wiring on a section of the trim servo motor drive assembly on jets. Instrument mechanic for Northeast for the past 10 years.

Eastern Region (General Aviation) George R. Williams, chief mechanic, American Can Co., Westchester County Airport, White Plains, N. Y., for developing the idea of fabricating a special harness assembly on the landing gear of a turboprop aircraft to replace the existing assembly which was deteriorating. Malfunctioning of the gear cable assembly had been reported due to broken wires and deterioration caused by oil. Aircraft production models now use the fix.

Southern Region (Air Carrier) J. R. Hollen, electronic systems maintenance, Eastern Air Lines, Miami, for improving the fuel quantity indication system of jet aircraft by recommending replacement of certain electrical parts and by changing specific wiring circuits. Joined Eastern in 1952.

Southern Region (General Aviation) Ray Montgomery, supervisor of maintenance, Capitol Airways, Berry Field, Nashville, Tenn., for engineering and fabricating a long range fuel system for a light twin-engine airplane. Unique, trouble free modification enabled aircraft to be ferried safely across the Atlantic. Joined Capitol in 1955.

Southwest Region (Air Carrier) Donald L. Perkins, maintenance inspector, Trans-Texas Airways, San Angelo, Texas, for uncovering slight evidences of rust on the rudder horn of a transport aircraft which led to disclosure of extensive internal decomposition of the part. His actions alerted other operators of the condition and the manufacturer recommended the part be replaced with an improved type. A 15-year veteran with Trans-Texas, he is a graduate of the Spartan School of Aeronautics in Tulsa.

Southwest Region (General Aviation) Edward J. Swearingen, Jr., owner of the Swearingen Co., International Airport, San Antonio, Texas, for developing an engine exhaust analyzer which enables the pilot to visually see the effects of mixture control setting. Permits adjustment of the carburetor and mixture for maximum power output. Has wide application to reciprocating engines of all types.

Alaska Region (Air Carrier) Edward N. Rozmenoski and Robert E. Lilly of Northern Consolidated Airlines, Anchorage, Alaska, for designing and fabricating a plexiglass bubble to cover a cabin window in a small transport. The window in question was in line with the turboprop propeller which idled fast on the ground and could hurl ice, rocks and debris against the window, frequently damaging it. The bubble window has been installed on all NCA aircraft and has eliminated the problem.

Alaska Region (General Aviation) Wesley K. Landes, president, Airglas Engineering Co., Anchorage, Alaska, for designing and constructing seaplane floats filled with fibreglass foam. If outer shell of the floats should be punctured, the aircraft will continue to float since the foam does not absorb water.

Pacific Region (Air Carrier) James Chenoweth, lead mechanic, hydraulic department, Hawaiian Airlines, Honolulu, for developing a special gauge which accurately measures overtravel of an actuating cylinder in the nose gear of an airline aircraft. Excessive overtravel, hard to detect, causes stress and damage to parts, but gauge has now eliminated the problem. Joined Hawaiian Airlines in 1948 after more than 20 years' experience as an aircraft mechanic.

Pacific Region (General Aviation) Andrew M. Caserio, senior lead mechanic, instrument repair station, Aloha Airlines, Honolulu, for designing and constructing special instrument and electronic test equipment for an instrument repair station. Designed many of the mockups used for checking all types of aircraft instruments on a wide variety of airplanes. Joined Aloha in 1948.

Europe, Africa and Middle East Region (Air Carrier) Walter Hargraves and Dudley Baker, mechanics for Pan American at N. Y. International Airport, for designing a special precision rigging kit to expedite rigging and trouble shooting of major flight controls on jet aircraft. The kit eliminates errors possible in previous rigging practices.

John Motta, award winner .n air carrier category.

TOGETHERNESS IN THE COCKPIT ENHANCES SAFETY

Left, first group taking ground instruction. Right, Mrs. Betty Van Coelen, 70, budding "pinch-hitter."

When a pilot is flying with his wife at his side, togetherness could mean more than just achieving marital amity. Her knowledge—or ignorance—of flying fundamentals could mean life or disaster in case of an emergency.

To cope with an emergency that might incapacitate the pilot, the Aircraft Owners and Pilots Association has launched a "pinch hitter" course for wives who are not pilots.

The eight-hour curriculum, set up by Ralph F. Nelson, project director of the AOPA Foundation, Inc., includes four hours of ground instruction and four hours of flight. Ground instruction covers basic omni navigation and VFR chart navigation, plus fundamental theories of flight and essential nomenclature. Flight instruction is limited to straight and level flying, turns, navigation and landing.

Instructors are careful to accentuate the positive in order to allay the women's inherent fear of flying. Technical jargon is kept to a minimum and criticism of technique is non-existent. "Our objective," says Ralph Nelson, "is to quell fears by making the unknown known."

At the AOPA Plantation Party in Palm Springs, Calif., 140 women and a 17-year old boy took the "pinch hitter" course. Their enthusiasm reflected the effectiveness of the course: A Worthington, Ohio, woman who flew out to the party by jet rather than fly with her husband, took the "pinch hitter" course, cancelled her return jet reservation and flew home with her husband in perfect togetherness.

Traffic Controllers Lauded for "Big Lift" Efforts

FAA air traffic control facilities played a major role in expediting Exercise Big Lift, the largest single movement by air of troops and supplies in U. S. history. The giant airlift, held late in October to demonstrate U. S. capability for quick reinforcement of ground troops stationed in Europe, was from southwest U. S. to Europe and return.

Recognition of FAA's role in helping to make the exercise a success was taken by Gen. Joe Kelly, MATS commander, who sent a congratulatory message: "Please convey my sincere appreciation to all FAA personnel that participated in Operation Big Lift for a job well done. Their fine spirit of cooperation and teamwork contributed directly to the success of the operation."

FAA's Central Altitude Reservation Facility (CARF) at Bailey's Crossroads, Va., handled the necessary altitude reservations and the coordination of routes in both domestic and foreign airspace for SAC's KC-135 jet refuelers and TAC's supersonic F-100 and F-105 fighters escorting the MATS C-130 transports.

The transports, laden wi.h approximately 16,000 troops and 27,000 tons of equipment, were handled on individual flight plans by some 11 FAA control centers from Albuquerque to Boston. Upon the Boston Center, particularly, fell the brunt of clearing the fighters funneling into Dow and Loring Air Force Bases in Maine from bases in New Mexico, Louisiana and South Carolina for temporary stops before being deployed across the North Atlantic.

In addition to CARF and the Boston Air Route Traffic Control Center, other FAA center facilities handling the military aircraft were Albuquerque, Fort Worth, Kansas City, New Orleans, Memphis, Atlanta, Indianapolis, Jacksonville, Washington and New York.

Joint Air Defense-Civil Traffic Control Facility Is Established

The first Air Route Traffic Control Center specifically designed as an integrated air defense/air traffic control facility went into operation this month at Great Falls, Mont.

Located at the site of the Air Defense Command's SAGE Direction Center at Malmstrom AFB, Mont., FAA's new Great Falls Center will make joint use of Air Defense Command operational facilities, computers, long-range radars and other equipment. It will provide air traffic control services to civil and military aircraft operating in approximately 135,000 square miles of airspace overlying the State of Montana and the western half of North Dakota.

This program is designated the Northern Tier Integration Project (NOTIP).

The operational cutover, which marks the end of the old Great Falls Center, gives the new FAA facility a considerably enlarged control area.

While it retains its individual identity as an FAA facility, the Great Falls NOTIP Center represents a new concept in common air defense/air traffic control surveillance. Joint use of FAA and ADC long-range radars for air defense, air traffic control high altitude civil jet advisory service and other purposes has been under way for a number of years. This joint use program has proved to be efficient and economical, saving the government millions of dollars by avoiding the duplication of facilities and equipment as well as overlapping functions.

For the first time in air traffic control, controllers will have available processed digitalized data from a number of radar sites which will provide a composite picture of the air situation for the entire area covered by the various radars. This data reaches the Center via telephone circuitry. Computers combine the radar data from the various sources and display the composite picture on the controller's scope. The display is in the form of alpha-numerics, including aircraft identity, aircraft altitudes (both assigned and reported), and other information that the controller can call for electronically. The system also provides automatic tracking of targets on either primary or secondary radar, or a combination of the two; computer-generated radar hand-off displays and special alerting features.

Commissioning of the new Center marks the 20th and next-to-last Center to be relocated in new quarters under the Federal Aviation Agency's current consolidation and re-alignment program.

FAA ESTABLISHES DELIVERY POSITIONS FOR SST

Japan Air Lines tenders SST order to N. E. Halaby.

Delivery positions for the first 70 U. S. supersonic airliners to come off the production line have been established.

Airlines that have requested delivery priorities and placed advance royalty payments with FAA will receive full refunds if they wish to withdraw because delivery assignments are judged unsatisfactory to them. Agreements between the government and the airlines providing delivery positions are to be executed. The positions will be stipulated in the prime development contract between the government and the manufacturer selected in design competition now under way.

Five United States and foreign air carriers have to date requested delivery priorities for 39 aircraft and submitted a total of $3.9 million in advance royalty payments of $100,000 per airplane. These deliveries have been requested:

Trans World Airlines, six aircraft, October 14, 1963; Pan American World Airways, fifteen, October 14, 1963; American Airlines, six, October 21, 1963; Alitalia, three, November 1, 1963; Trans World Airlines, four, November 13, 1963; and Japan Air Lines, five, November 15, 1963.

The first United States supersonic airliner has been assigned to Trans World Airlines, which submitted the first request for delivery priorities. According to the projected program timetable, this aircraft may be available for commercial service by the middle of 1970. TWA will also receive airplanes number 3-6-11-15-26-33-47-52-55.

The second airplane will go to Pan American, which submitted the second request for delivery. Pan American will also receive airplanes number 4-7-12-16-27-32-43-50-54-58-61-64-67-70.

The first foreign carrier to request delivery, Alitalia, will receive the fifth airplane produced, as well as number 9 and 21.

American Airlines, the first purely domestic airline to request delivery, will receive the first delivery to a domestic airline. This will be the eighth airplane off the production line. American also has been assigned airplanes number 13-20-31-40-48.

Japan Air Lines, the first foreign carrier in the Pacific area to request delivery, will receive the nineteenth airplane produced, as well as airplanes 23-30-46-57.

General Aviation Pilots File More VFR Flight Plans

Approximately 1,160,000 VFR flight plans were filed by general aviation pilots during fiscal year 1962, an increase of two per cent over the previous year.

The two per cent increase applies to the conterminous states. In Alaska, Hawaii and Puerto Rico, VFR flight plans increased by 22 per cent to 50,000 plans, or 9,000 more than the previous year.

Reports from FAA air traffic control facilities that handle VFR flight plans also show that the Los Angeles area was the leading area in which VFR plans were filed, maintaining its lead of the previous year. The Los Angeles area's daily average volume of VFR plans filed was 236, or 25 per cent over its 1961 record. It was the largest gain registered by an air route traffic control area within the conterminous U. S.

The daily average of VFR flight plans filed within the 48 states was 3,042—a one per cent increase over 1961.

The five leaders were Los Angeles with a total of 86,260 VFR plans for the year, Oakland with 69,280, Kansas City 56,100, Albuquerque 53,520, and the Seattle area with 53,080. Of the five, Kansas City showed a decrease of nine per cent.

Other areas indicating less VFR flight plan filing were Minneapolis which dropped by eight per cent, Denver five per cent, Chicago ten per cent, Phoenix eight per cent, Boston five per cent, Detroit 29 per cent, Salt Lake City 30 per cent, and Great Falls, New Orleans and Cleveland areas six, two and four per cent less, respectively.

Outside the 48 states, Anchorage and Fairbanks showed decreases of four and seven per cent, respectively, but Honolulu and San Juan jumped by 29 per cent and 333 per cent.

FAA has issued a certificate of waiver authorizing a prominent Arctic aviator and philanthropist to deviate from certain air traffic rules during the evening of December 24 and the early morning hours of December 25.

FAA Administrator N. E. Halaby said the waiver is consistent with the public interest and the petitioner has special qualifications which permit him to operate contrary to established flight rules without creating a hazard to other aircraft or to persons or property on the ground.

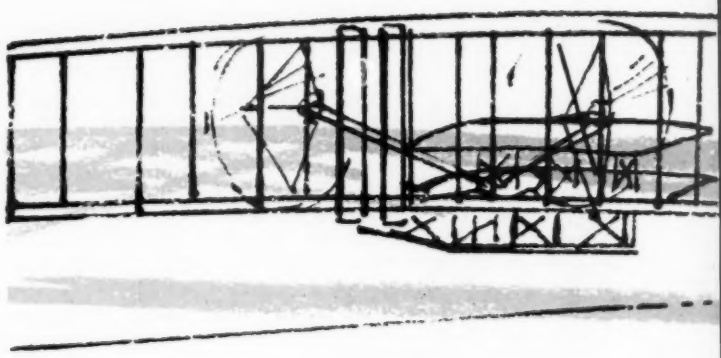
The Administrator cited the petitioner's accident-free record as sufficient ground in itself for issuance of a waiver.

Under the waiver, the petitioner is authorized to disregard certain of the air traffic rules contained in Part 91 of the *Federal Aviation Regulations*. These include:

- *91.33*—The petitioner is exempt from civil aircraft instrument and equipment requirements. This will permit use of a somewhat obsolete aircraft traditionally employed by the petitioner on Christmas Eve.
- *91.73*—The petitioner is authorized to operate without prescribed position lights in order to prevent detection by small, wide-eyed children.
- *91.79*—The petitioner may fly below prescribed minimum altitudes which are 1,000 feet over cities and towns and 500 feet over open country. Petitioner normally operates at roof-top level.
- *91.13*—Rule against dropping objects from aircraft in flight may be ignored. This will permit the petitioner to drop brightly-wrapped packages, as well as himself, down chimneys.
- *91.13*—Petitioner may disregard aircraft identification and marking requirements in order to preserve his anonymity.
- *91.17*—The petitioner is authorized to tow extra sections in order to meet the needs of the world's growing population, provided he displays a long white banner after the final section which states:

Merry Christmas to All from the Federal Aviation Agency!

Kill Devil Hill, Kitty Hawk, N.C., before construction of First Flight Airport. On right is Wright Memorial Shaft; in background is visitor center.



NEW KITTY HAWK AIRPORT, WRIGHT AIRPLANE

Flying has returned to Kitty Hawk, its birthplace. The roar of airplanes landing and taking off now marks the miracle of the Wright Brothers' first powered flight from level ground at the base of Kill Devil Hill, 60 years ago.

This month, on the 60th anniversary of that December 17 historic event, First Flight Airport was dedicated. It is the result of a cooperative effort of the State of North Carolina and the Federal Government. Now a part of the Wright Brothers National Memorial, the airport's 3,000-foot runway closely parallels the path of the first flight. Nearby a granite boulder marks the first flight's actual take-off spot. In the background, a memorial shaft high on Kill Devil Hill commemorates the Wright Brothers' achievements.

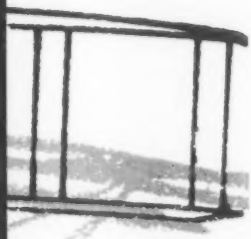
The first flight, according to Orville Wright, ". . . lasted only 12 seconds, but it was nevertheless the first in history in which a machine carrying a man had raised itself by its own power into the air in full flight, had sailed forward without reduction of speed, and had finally landed at a point as high as that from which it started."

New, too, at Kill Devil Hill is an exact full-scale replica of this first-flight airplane. The original is on permanent exhibition at the Smithsonian Institution's National Air Museum in Washington, D.C. The replica, sponsored by the American Institute of Aeronautics and Astronautics (AIAA), is the work of many men.

Stepping back sixty years to build the replica was not easy. Materials and techniques used by the Wrights are lost in yesterdays. But as nearly as possible, the scientists, engineers, pilots, mechanics, housewives and industrial organizations who volunteered for the job have produced an authentic full-scale copy of the Wright Brothers' wood-and-cloth biplane. Pratt & Whitney Aircraft Division of United Aircraft Corporation furnished the hand-made engine, complete in every detail except for the pistons. They have been omitted so that children —six to sixty and more—can turn the props and relive the thrill and expectancy of that cold windy day, December 17, 1903, when Wilbur turned the props, and Orville flew for 12 seconds into history.

Fifty volunteers worked on the replica which started in January, 1963. Difficulties in finding exactly the same materials used by the Wrights stalled the project until early summer. As the needed materials were found—and donated to the project by industry—working groups started on the sub-assemblies.

These were headed by Glenn D. Babbitt of the Cleveland Pneumatic Tool Division, Pneumo Dynamics Corp.—skid



Above and clockwise: Original Wright Brothers' airplane that made first powered flight, now on display in Smithsonian Institution's Air Museum in Washington; Air Vice Marshall (ret.) Walter C. Sheen, RAF, one of team that built Wright replica, examines fuel cutoff control on engine; Isaac "Ike" Hoover, FAA engineer, scales dimensions from blueprint of propeller drive system that was constructed at FAA's Aeronautical Center, Oklahoma City; U.S. Navy aviation mechanics assemble ribs and front spar of wooden replica of wing structure. Left to right are Roland Woodruff, James Trent and Benjamin Poindexter.

PLICA MARK ANNIVERSARY OF POWERED FLIGHT

assembly; Richard Hartley, Bethesda, Md.,—propellers; Isaac Hoover (FAA) and John P. Kennedy of Springfield, Va.,—propeller drive; Harcourt C. Sontag of Arlington, Va.,—instrument group; Elliott DeGraff of Bowie, Md.,—flight controls; Richard Murphy of Bethesda, Md.,—aft rudder assembly; Captain P. T. Holt, USN, Bethesda, Md.,— forward surface assembly; Lt. Cdr. Tom Kastner, USN, and Benjamin Poindexter of Patuxent River, Md.,—wing assembly; Dr. Richard Duncan and Edward Granville, Pratt & Whitney Aircraft Division, East Hartford, Conn.,—mockup of the Wright powerplant. Final assembly was done in the Virginia warehouse of the British Aircraft Corporation.

FAA's participation in the project included construction of the propeller drive shaft at its Aeronautical Center in Oklahoma City. The drive shaft is composed of chains, chain guides, sprockets and propeller drive shaft housing.

Maj. Gen. Marvin C. Demler (USAF), AIAA President, stated, "Believe it or not, it's harder to build the Wright plane today, than it was in 1903. The project is demanding every talent of our space and jet age experts. All of the materials and techniques available to the Wrights, crude as they may seem today, have long since been replaced by more modern machines and methods. Consequently, stepping back sixty years to build the plane exactly as it was constructed then, with the same materials, is a real challenging venture."

More than a million visitors a year visit the Wright Brothers National Memorial at Kill Devil Hill, N.C. They come by bus, by private car and now by "flying machine" to First Flight Airport.

The airport has a single 3000 x 50-ft. paved runway with parrallel taxiway, turn arounds, 300 x 200-ft. parking apron, access road to tie in with the existing roadway system serving the Wright Memorial, and wind cone and segmented circle. Clear zones are provided to insure a 20-to-1 glide angle at both ends of the runway.

Originally proposed by the Department of Interior's National Park Service, which owns the land and operates the Wright Brothers National Memorial, the airport is a joint venture of the Federal Aviation Agency, the Department of Interior and the State of North Carolina. Each contributed one-third of the cost. Out of funds allocated under the Federal-aid Airport Program, the FAA contributed $44,444.

By car, the memorial is 75 miles south of Norfolk, Va. via U.S. 17 or 158 to Elizabeth City, N.C. and then U.S. 158. A more direct route is by "flying machine" from Anyplace, U.S.A. to First Flight Airport, Kill Devil Hill, N.C.

OPEN HOUSE AT DULLES

An estimated 110,000 residents of Metropolitan Washington flocked to Dulles International Airport last month as part of FAA's nationwide open house observance of its fifth birthday. Visitors peered at the latest in military aircraft—the F-4 Phantom II, world's fastest tactical fighter, and the B-58 Hustler. Civil airplanes, ranging from antiques of the 1920s to jet transports, included three FAA flying electronic laboratories used for inspection of navaids—the C-135, Convair 440 and the venerable DC-3.

Left and clockwise: Awed youngster tries out cockpit of fighter airplane; visitors stream through FAA C-135, a flight inspection airplane packed with electronic gear; school children eavesdrop on air-ground conversation between pilots and controllers at Washington Air Route Traffic Control Center; Allen Dulles, former head of Central Intelligence Agency and brother of the late John Foster Dulles, for whom airport was named, visits tower with chief controller Walter Britton; part of crowd of visitors at two-day open house.

CARBON MONOXIDE INVADES COCKPIT, PILOT "TALKED" TO SAFETY

In foreground, FAA flight service specialist Preston J. Gauthier.

October 16—another routine day at the FAA Flight Service Station located at Esler Field near Alexandria, La.

Station chief Perry W. Conally and the day shift had gone home. Now there were two men on duty:

Truman Stanley, a 23-year veteran of FAA, was handling military aircraft flight service and also assisting aircraft from the Forestry Service in spotting a series of fires which had broken out in the area following a long drought.

Preston J. Gauthier (pronounced Go-Shay) was at the console which monitors all of the air-ground frequencies. Gauthier is 41, a veteran of the Army Signal Corps, and has been in the FAA organization since 1946.

The October issue of *FAA Aviation News* was before Gauthier on the console opened to an article which warned airmen of the danger of carbon monoxide poisoning from defective cabin heater units.

Gauthier had just finished reading the article only minutes before. The time now was 5:25 p.m. Central Standard Time.

Then the voice of Roderic B. Bushnell crackled over the loudspeaker. He was at 5,500 feet, he said, and added that he felt dizzy and was experiencing blurred vision.

Bushnell was well-known to Gauthier and the other flight service specialists at the Esler Field facility. The 24-year-old student pilot flies his own airplane—a red-and-white Luscombe Silvaire—and has been a regular user of the Flight Service Station.

Just 10 minutes earlier, Bushnell had filed a flight plan by radio and received a briefing on wind and weather conditions prevailing along his planned route—from Buhlow Lake Airport in Alexandria to Baton Rouge, the state capital of Louisiana, 90 miles southeast. Bushnell advised the Flight Service Station that he was climbing to 5,500 feet.

Now he had reached that altitude and was in trouble.

Gauthier recognized the symptoms immediately. The copy of *FAA Aviation News* was still open on the console:

CARBON MONOXIDE POISONING

"The first symptom of carbon monoxide poisoning is a feeling of tightness across the forehead usually accompanied by a slight headache. As the poisoning becomes more severe, the headache increases and there is a throbbing in the temple. Next, there may be severe headache, general weakness, dizziness and dimming of vision. Then, there is a decided loss of muscular power, vomiting, convulsions and coma. The pulse gradually weakens and the respiratory rate slows until there is a complete respiratory failure and death."

Gauthier pushed his microphone button and warned Bushnell that carbon monoxide probably was present in the cockpit. Turn off the cabin heater immediately, he advised, open a window and descend to 2,500 feet.

The pilot then was directed to the Marksville Airport, which Gauthier estimated was approximately 10 miles directly ahead, based on the aircraft's time of departure, course and airspeed. Marksville is approximately 30 miles southeast of Alexandria.

Gauthier next alerted the Louisiana State Police and requested that a unit stand by at the Marksville Airport with an ambulance. The pilot was advised of this action.

At 5:32 p.m.—just seven minutes after the first indication of trouble—Bushnell reported he was at 2,500 feet and was experiencing numbness and muscle spasms in his arms and legs and a severe pain in his left ear. However, the pilot said he had the Marksville Airport in sight and believed he could make it.

He did. The aircraft landed safely at 5:40 p.m. A unit of the Louisiana State Police was on hand as requested and rushed Bushnell to the Marksville Hospital where Gauthier's suspicions of carbon monoxide poisoning were confirmed.

After treatment, Bushnell was released from the hospital and decided to continue his trip to Baton Rouge, this time with the aircraft heating system turned off. At 8:45 p.m., he filed a VFR flight plan and departed Marksville, arriving safely at Baton Rouge at 10:55.

Two hours later, Preston J. Gauthier finished his shift at Esler Field Flight Service Station and went home to a place called Paradise Community where his wife, four children and two hunting dogs were waiting for him.

It had been a routine night—but a satisfying one.

CEILING

This is the ninth in a series of articles on aviation weather prepared by meteorologists of the Weather Bureau.

The term "ceiling" entered the aeronautical lexicon during the first three decades of powered flight when the base of the lowest extensive cloud layer imposed an upper limit—an actual ceiling—on continued flight. Today, ceiling does not have quite the same meaning to pilots of aircraft equipped with instruments for flying blind. But to a large segment of general aviation, the existence of a ceiling is of critical importance.

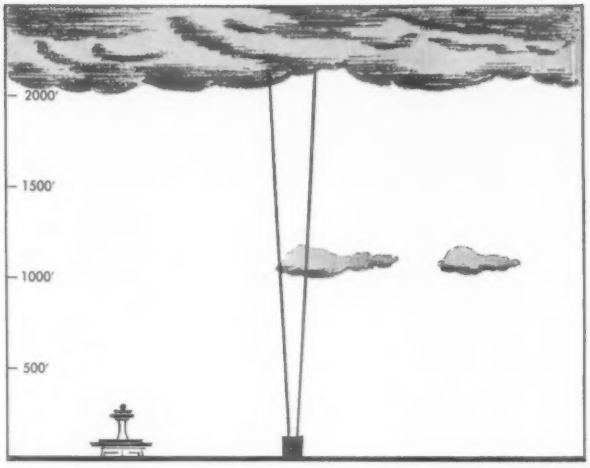
Clouds covering more than half of the sky create a ceiling for aircraft. In order to determine the ceiling, the weather observer must first know the heights of the cloud bases above the ground. Cloud heights may be measured by instruments, balloons and aircraft, or they may be estimated. Experienced observers can estimate the height of low clouds within 100 feet and middle and high clouds within 1000 feet. Consequently, an estimated ceiling is not necessarily inaccurate. However, since ceiling is a critical operating limit, every effort is made to ensure the accuracy of the observation.

Devices for Measuring

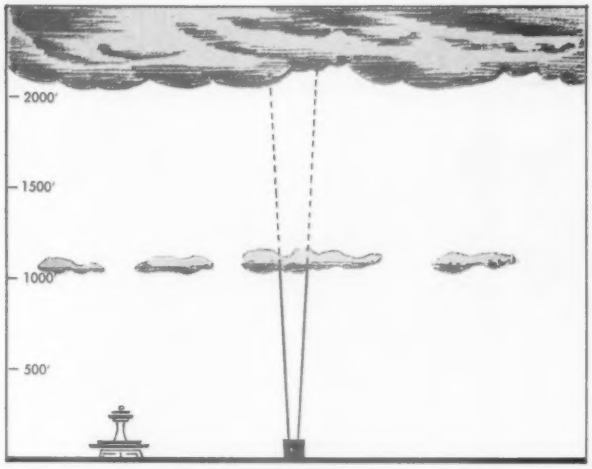
Balloons for measuring cloud height have a predetermined rate of ascent. The observer simply times their rise to the cloud base and computes the distance.

One means of determining cloud height at night is by use of the ceiling light, a searchlight that projects a narrow vertical beam on the cloud base. The observer, standing at a known distance from the beam of light, measures the elevation angle between his position and the spot on the cloud made by the beam of light. He can then calculate the length of the third side of the triangle—the distance between the cloud and the ground.

Another device, the ceilometer, is the most advanced instrument for determining cloud height (*see photo*). The reflection cast on the clouds by a beam of light is measured by a special detector. The detector is sensitive only to the



Because the sparse lower clouds do not cover more than half of the sky, they do not constitute a ceiling. But the overcast at 2,000 feet does.



However, an increase in clouds at the lower layer results in the ceiling being reported as 1,000 feet instead of the 2,000 feet shown at left.

projected light and therefore is usable in the daytime as well as at night.

There are two types of ceilometer, fixed-beam and rotating-beam. In the fixed-beam ceilometer, the light projector is stationary and the detector moves up and down to locate the light thrown on the cloud base. In the rotating-beam ceilometer, the projector circles rapidly while the detector is fixed. At U. S. airports, 150 fixed-beam and 130 rotating-beam ceilometers are in operation, and the Weather Bureau has scheduled the installation of 273 more rotating-beam devices.

Determining Cloud Coverage

Having measured the cloud heights, the observer next determines how many tenths of the sky are covered by each layer. If a cloud layer covers from one-tenth to five-tenths of the sky, the clouds are said to be *scattered*. If it covers from six-tenths through nine-tenths of the sky, it is classified as *broken*. When cloud layer covers the whole sky, the report is *overcast*.

To obtain a ceiling value, the weather observer uses a summation method. Beginning with the lowest level of existing clouds, he progressively adds the amount of cloud cover in each higher layer until the sum reaches six-tenths or more. The level at which the total sky cover reaches six-tenths is reported as the ceiling height.

For example, one-tenth of the sky might be hidden by clouds with bases at 1000 feet, three-tenths of the sky covered by clouds at 2,500 feet, and another three-tenths hidden by clouds at 4,000 feet. The observer would report 1,000 scattered, 2,500 scattered, ceiling 4,000 broken. At the 4,000-foot level, the sum of the cloud cover equals seven-tenths.

The clouds in this situation might very well be located in different parts of the sky. To the pilot in flight, there would appear to be no ceiling. From the ground, the weather observer can never be sure that lower clouds are not concealing more clouds above them. *His view is totally different from that of the pilot moving through the air, and this difference largely accounts for pilots' disagreement with ceiling reports.*

For the same reason, a ceiling report of 5,000 broken does not always indicate that no other cloud layers exist at higher levels. The broken layer may hide the higher clouds.

When evaluating sky cover, the observer reports all layers, even those through which sky is visible. These thin, transparent layers are reported so that pilots and forecasters may know they exist. They could easily thicken and become a significant layer. As long as they are transparent, these layers are not included in the sum for determining ceiling. To a pilot in the air, however, they may seem opaque when viewed from a distance or at a low angle.

Another difficulty in reporting ceiling is that cloud bases are seldom flat. During low ceiling conditions, cloud bases may vary several hundred feet within a few minutes, and the pilot may find the ceiling somewhat higher or lower than reported.

Moreover, in a matter of minutes, the most accurate ceiling report can become obsolete. The effect of a slight shift in the relative positions of two cloud layers can be seen from the illustrations on the page.

Pilot Reports Invaluable

The differing viewpoints of the pilot and the observer, as well as the rapidly changing nature of ceiling, make pilot reports—PIREPS—of inestimable value to the aviation weather service. Pilots sometimes ask why their reports of ceiling are not listed as "Aircraft" ceilings in weather reports. Usually, this is because the report was made at a distance greater than 1½ miles from the end of an airport runway—the maximum distance allowable. Or the ceiling may have been measured by instrument after the pilot report was received. In any case, the pilot report is very helpful in verifying layers or inconclusive ceilometer readings.

Visibility, cloud and ceiling—the three keys to VFR and IFR operation—are interrelated. For safety's sake, the pilot should check them all when reading weather reports and never neglect the pertinent remarks added by the trained observer on the spot.

SAFETY FIRST

Watch Your Fuel

"We're out of gas!"

This line has been used with varying success by generations of young American males in an attempt to become better acquainted with young American females while parked on some lonely lover's lane.

The approach has never gained wide acceptance in aviation, however. Most pilots do not regard fuel exhaustion as a suitable subject for levity. It has caused too many accidents and too many deaths.

Last year, for example, fuel exhaustion resulted in 191 general aviation accidents, 10 of them fatal. These preliminary figures do not include helicopter and crop duster accidents.

Sixty-seven accidents, four of which were fatal, were caused by poor fuel planning prior to flight. Here is a typical example taken from a 1962 Civil Aeronautics Board accident report:

Aircraft experienced fuel exhaustion, made forced landing in open field and nosed over. No fatalities. Pilot reported that his flight preparation indicated he could reach his destination without refueling but would have little reserve fuel. A recomputation of his flight, based on performance data in the Owner's Manual, indicated that the pilot's computation was based on cruising flight fuel consumption. He had not, however, allowed sufficiently for starting, taxi, takeoff and climb.

Continuing flight when low on fuel was another prime source of accidents. The total was 51, two of which were fatal. One such accident occurred on July 2, 1962. The following is excerpted from the CAB accident report:

Aircraft ran out of fuel in airport traffic pattern. Attempted emergency landing but touched down short of runway. No fatalities. The pilot stated the aircraft was fueled to capacity before takeoff and should not have run out of fuel when it did. He added, however, that the gauges indicated fuel exhaustion before it occurred and he overflew suitable airports believing he could complete the flight.

Failure to switch fuel tanks caused 35 accidents, three of them fatal. Three other accidents resulted from improper positioning of the fuel selector valve.

Seven accidents, one of which was fatal, were caused by failure to turn on fuel for takeoff. One aircraft took off using fuel in the fuel lines, then crashed. Another 22 accidents, none fatal, resulted from pilots initiating flight with low or empty tanks. A prime example occurred on July 21, 1962, and involved a student pilot with an expired certificate who showed poor judgment:

Before flight from a private strip to another strip 15 miles away, pilot noted the right fuel gauge showed empty and left fuel gauge showed in the red area between empty and one-fourth full. Flight was initiated anyway and resulted in forced landing three minutes after takeoff. The pilot was not seriously injured.

The accidents reported here, like most accidents involving fuel exhaustion, could have been prevented if the pilots had exercised a little common sense or been a bit more attentive to the mechanics of flight.

The importance of preflight planning can not be overemphasized. Before takeoff, the pilot should determine whether he will have enough fuel to complete the flight with adequate reserves. If not, the itinerary should be changed accordingly.

Information on aircraft fuel consumption rates at different altitudes, power and mixture settings can be found in the Owner's Manual or in other material on operational performance. Pilots should consult these sources when computing fuel loads.

On cross-country trips, many pilots prefer to use up most of the fuel in one tank before switching to the other tank or tanks. This procedure provides them with an in-flight check of the fuel consumption rate. By measuring the time required to use the fuel in one tank, the pilot can obtain a fairly accurate estimate of remaining flight time.

Special attention should be given in switching fuel tanks to make sure the selector valve is in proper position. The reason for this already has been illustrated here by a number of accidents.

Whenever possible, fuel levels should be checked visually during preflight. Pilots, as a rule, place too much reliance on their fuel gauges, and these can be wrong. The actual fuel supply may be considerably lower than the gauges show. Never assume there is more fuel than the gauge shows.

Letters

FAA

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. Please keep them brief. No anonymous letters will be used, but names will be withheld on request.

• Instrument Requirements

I understand that FAA is thinking of reducing commercial pilot and instrument time from 200 to 100 total logged hours. Can you tell me if this has gone into effect yet?

Melanie Schemberg
Highland Park, Ill.

FAA has not proposed any changes in the flight time requirements for commercial pilot licenses. Last February, however, the Agency issued a Notice of Proposed Rulemaking which would have the effect of making all private pilots eligible to train for an instrument rating. The proposal would drop the present requirement that private pilots must meet the flight time requisites for a commercial pilot certificate in order to qualify for an instrument ticket. The proposal has not as yet been adopted.

• Open Door Policy

Is it really true that I must have FAA permission to fly my Cessna airplane with the door off?

A recent magazine article stated that pilots must now obtain FAA authorization before operating civil aircraft with the door removed for sky diving, photography or other purposes.

Gene N. Verbrugge
San Jose, Calif.

Operation of civil aircraft with the entrance door removed requires FAA approval before the first flight. Primary concern over aircraft door removal may involve controllability, flight characteristics or, in the case of some aircraft, airframe structural deficiencies.

The Agency will provide pilots with appropriate operating limitations for flying with the aircraft door removed. Pilots should make written application to the nearest FAA General Aviation District Office and provide the following information:

(a) name and address of aircraft owner; (b) make, model and registration number of the aircraft; (c) place where the aircraft normally is based; and (d) reason the aircraft is to be operated without a door.

• Restricted Licenses

I am a week-end flight instructor at a small sod field. Most of my students are 35 years of age or older. I find many young men are unable to learn to fly because of the expense involved with the demand for radio and knowledge of instrument flying. Most of these pilots wish to fly just for the sake of being "up there," to relax on week-ends, or for short cross-country hops. They prefer to fly the light planes that are still around—the J-3 Cubs, Aeroncas, Cessnas and the ever increasing number of the home-builts.

Why wouldn't it be possible to have a separate classification of pilot's license, known perhaps as the "Sportsman" license, to fly these lower horsepower planes. After obtaining the "Sportsman" rating, any pilot could take steps to increase his rating if he so desired.

John M. Tomishin
Cleveland, Ohio

I feel that it is very important that a "restricted" private pilot rating be established so that pilots who learn to fly in an airplane without radio or instruments can be licensed to carry passengers such as family and friends.

Marvin L. Kelsoy
Thurman, Iowa

The need for an intermediate rating between student pilot and private pilot has been considered and evaluated many times by FAA. Twice in the past the regulations have provided for such a rating—amateur and solo pilot ratings. In each case, however, it was subsequently determined that a bona fide requirement for such a rating did not exist.

The main obstacle to the development of an intermediate pilot rating is the impracticability of establishing meaningful and enforceable operating limitations. For example, a pilot with limited navigation and communications capability would have to be effectively segregated from the modern, complex air traffic system and environment.

FAA's position on intermediate pilot ratings is not irrevocable, however. The Agency will continue to study this question in the light of new proposals and developments.

• Third Level Airlines

Is it possible to obtain information on "third level airlines," particularly those which might be classified as successful.

Robert O. Larson
Sheboygan, Wis.

FAA does not certificate a class of air carrier known as "third level air carriers." However, the Agency does certificate a class of air carrier designated as "air-taxi operator," which engages in direct air transportation of passengers and/or cargo. Several of these operators are operating on a scheduled basis.

For detailed information on air-taxi operators in your area, contact the FAA General Aviation District Office, General Mitchell Field, Milwaukee.

Additional information may be obtained from two organizations whose members are air-taxi operators: The National Air Taxi Conference, 1346 Connecticut Avenue, N. W., Washington, D. C.; and the National Association of Third Level Airlines, 1001 Fifteenth Street, N. W., Washington, D. C.

• Expired Certificate

On March 14, 1963, I obtained a student pilot certificate after being informed that a private pilot certificate issued to me in November, 1943, had expired. I now am wondering whether I could have been reinstated as a private pilot without first obtaining a student pilot certificate, passing flight and written tests, etc.

I find nothing in the copy of the regulations which I have that deals with this particular subject.

Since being granted a student pilot certificate, I have been flying regularly and have passed the written examinations for private pilot.

Name Withheld
Salem, Oregon

All private and commercial pilot certificates issued prior to July 1, 1945, expired July 1, 1947. Holders of expired certificates then were given ten years to reinstate themselves without the need for a further showing of competence. The reinstatement privilege ended September 1, 1957.

• Dusting by Helicopter

We would appreciate any information regarding procedure and regulations for application of sulphur dust by helicopters. Also any information on accident records.

Autair Helicopters
Salisbury, Rhodesia

FAA has not promulgated special regulations for the use of helicopters in dusting or spraying operations. However, to decrease the fire hazard when dispensing sulphur dust, Airworthiness Maintenance Directive No. 48-34-2 was issued and applies to all aircraft engaged in dispensing such dust. Among other things, it requires that engine exhaust gases not be discharged along the bottom of the aircraft and that the fuselage aft of the spreader opening be covered with fire resistant material.

The 1961 accident record—the latest complete statistics available—shows that 15 helicopters were involved in accidents while engaged in dusting or spraying activities during that year. However, there is no indication in the accident reports that sulphur was being dispensed at the time of the accident.

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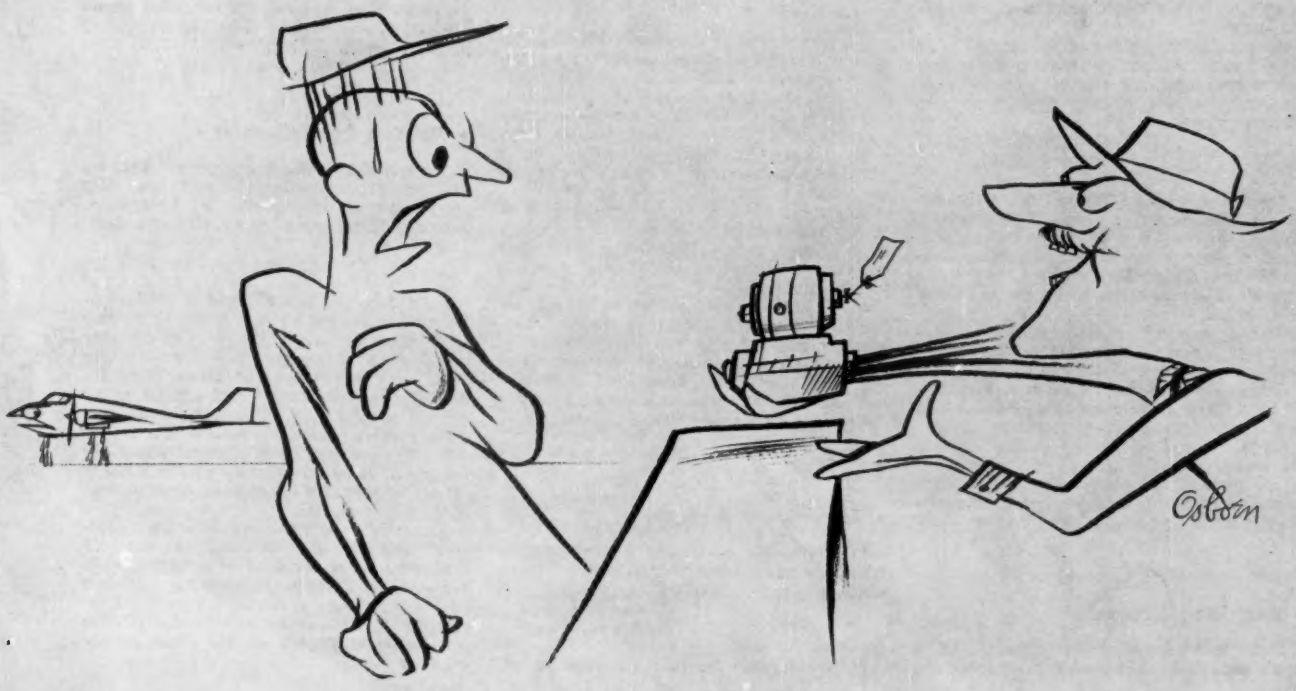

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